The NATIONAL GEOGRAPHIC MAGAZINE

Vol. XV NOVEMBER, 1904 No. 11

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WASHINGTON, D. C.

VOL. XV, NO. 11 WASHINGTON NOVEMBER, 1904

THE NATIONAL GEOGRAPHIC MAGAZINE

THE NEW ENGLISH PROVINCE OF NORTHERN NIGERIA

THE attention of the world has been focussed so sharply during the last five years on South Africa, the Philippines, and the Far East that the remarkable extension of British control over northern Nigeria, a territory of 500,000 square miles and containing a population of 20,000,000, has passed completely unnoticed. This extension has been made by Sir Frederick D. Lugard, British high commissioner to northern Nigeria, assisted by a few score white men and at an annual expense of about $2,000,000. Organized slave raiding and flourishing slave markets have been stopped, and it is believed a productive and rich commercial field opened to English capital. The fact that northern Nigeria is almost the only part of British tropical Africa which possesses a history extending over many centuries and a semi-civilization of its own long antedating the coming of the European give the region unique interest. Sir Frederick Lugard has recently given a report of his work,* including an account of the history of the province, from which the following notes are quoted in his own words:

The British force, consisting of 50 whites and 700 native troops, reached Kano (which is about 600 miles inland from Lagos) in February, 1903, and faced the stupendous walls, 30 to 50 feet high and 40 feet thick at the base, with a double ditch in front. Their perimeter was 11 miles, with 13 gates set each in a massive entrance tower. A small breach was made by our guns, and a storming party charged, under Lieutenant Dyer. The determined nature of the assault, and the prestige our troops had gained, and the effect of our shells combined to dissipate the courage of the defendants. Their leisurely retreat was changed into a panic-stricken rout by the charge of the mounted infantry. The town lies at the further end of the *enceinte*, inclosed by walls, and a distance of 1½ miles separated it from the scene of the fighting; so that no one was hurt except the actual combatants, and no damage whatever was done to the city. The troops marched to the king's inclosure, itself no mean citadel, covering 33 acres of ground. Sentries were posted at the gates, and no man was allowed to go out with

* An address before the Royal Geographical Society, published in the Geographical Journal of London.

arms, so that no friction might occur and no violence be perpetrated in the town. Later three soldiers did manage to break out and kill a man in a quarrel in the market. The murderer was tried by court-martial and shot, and I desired that one or two of the Kano chiefs should be witnesses of this vindication of British justice. In the arsenal was found every conceivable kind of ammunition and a great quantity of powder. About 20,000 rounds were destroyed and 350 firearms. Within three days of our occupation three large caravans left for the south, and the great market was in full swing, as though nothing had happened.

I had myself joined the force after the capture of Kano, marching up from Zungeru by the wonderful caravan road which leads through Zaria. I have seen nothing like it in Africa. The track is often 50 feet wide, and one meets ceaseless caravans of laden donkeys, men, women, and live stock along its whole length. I must have passed many thousands in the 250 miles we traversed to Kano. Between Zaria and Kano the road is frequently inclosed between hedges of great age, a very striking contrast to the universal bush path of Africa. The road leads for the most part through cultivation and villages. The method of cultivation is more thorough and more advanced than is usual in Africa. The soil is worked to a depth of over a foot, and here and there rude forms of irrigation are employed, while for the first time in Africa I saw with surprise that the fields are manured. The tamarind, the Dum palm, the acacia, and the Adansonia take the place of the shea, copaiba, and the locust trees of the south.

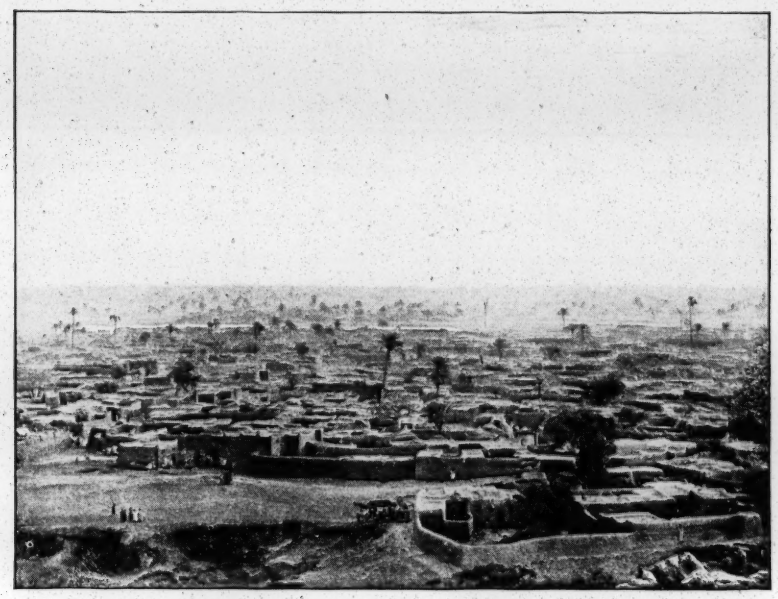
THE CITY OF KANO

Kano alone, among the cities of Africa which I have seen, with the exception of Katsena, is worthy of the name of city, for its houses are of solid mud, with flat roofs impervious to fire, and lasting through the centuries, instead of the beehive-shaped huts of the populous towns of the south. Traces of Moorish architecture are visible everywhere, and the horseshoe arch, which some writers assert was introduced by the Arabs from Syria and Mesopotamia, modified by the Berbers and Egyptians, is a feature of the buildings.

I took up my quarters in the small hall of audience, a room 25 feet square, 18 feet high, decorated with quaint shapes and designs in black, with pale green and yellow—the latter formed of micaceous sand, which glistens like gold. The dome-shaped roof is supported by twenty arches, all of mud, but admirably fashioned, and converging on the center. The photo (see page 439) will give you a better idea of its structure than my words can convey. Kano thus marks the limit of the northern type of building, of which only occasional reminiscences are seen in some emir or chief's house in Zaria and Bida. Admirable in design as were the great houses of the king and chiefs of Uganda before the Pax Britannica taught the people to prefer architecture of the railway-shed pattern, they were but of grass and palm stems, which a fire would destroy in a night; but the greatest fire would leave Kano intact as a city.

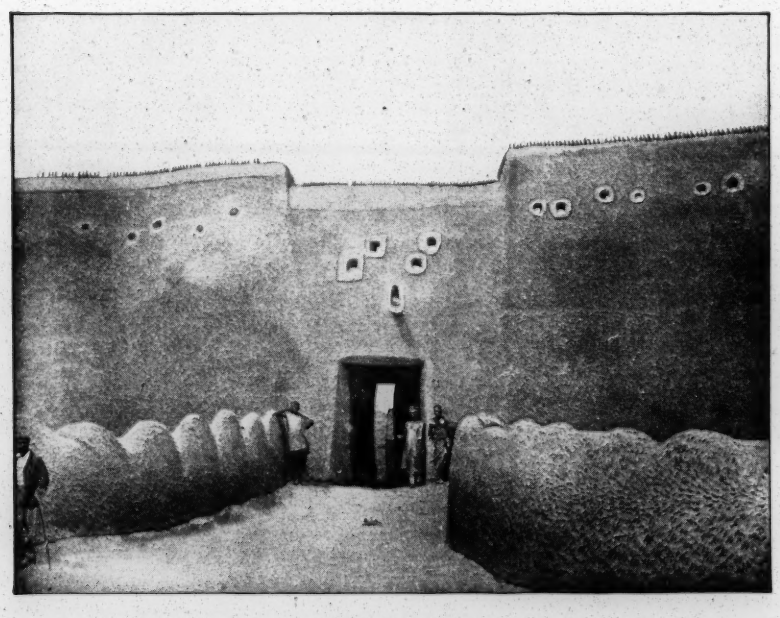
The city is divided, like all others in Nigeria, into quarters where the different races congregate, and it is striking to see white-faced Tripoli merchants with their wares of tea and sugar, silk and spices, in the Arab quarter of this African city.

There are large open spaces everywhere in Kano, each with its enormous hole of reeking sewage, from whence the clay has been dug to build the houses. Unlike Bida, which, as you approach it, looks like a forest, Kano is almost treeless. Over these bare spaces sweeps the dusty wind, and on the margins of the great holes or stag-

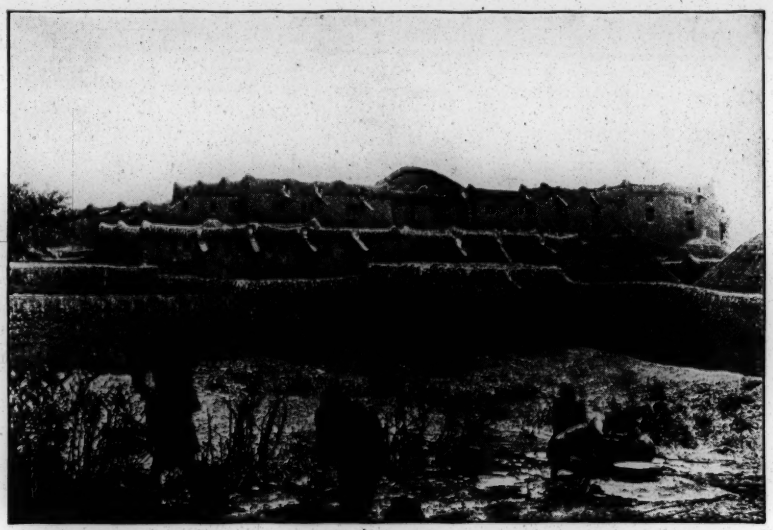


View of Kano from the Dallah Hill

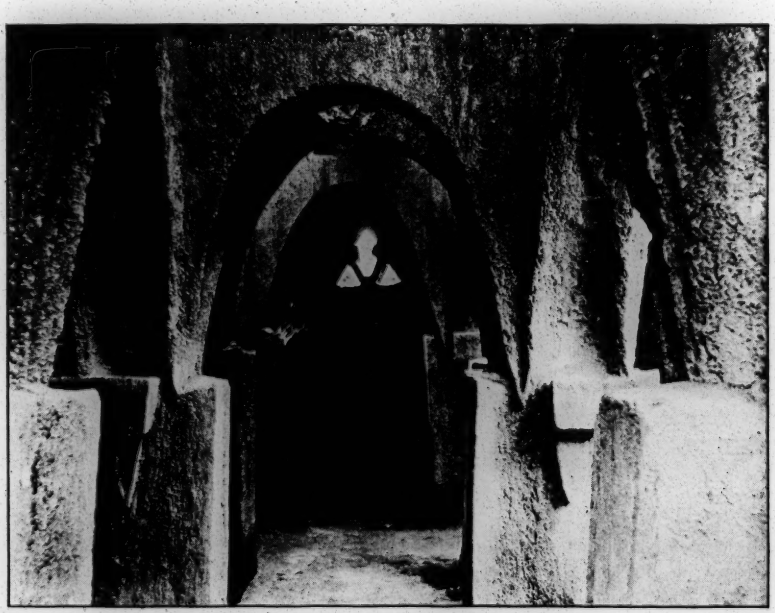
For this and succeeding pictures of Kano the NATIONAL GEOGRAPHIC MAGAZINE is indebted to the *Geographical Journal* of London



A Kano Gate



The Emir of Kano's Palace



Interior of Native Emir's Palace

nant tanks the vultures fight for the carcase of some dead dog or the stray leg of a bygone fowl.

The great market is said to contain a floating population of 30,000 persons, and camels, horses, asses, oxen, and goats are exposed for sale. Tripoli merchants, Asbenawa from the desert, Salaga merchants from the Gold Coast, and Hausas each sell their own particular class of wares. I would linger here and describe to you this interesting town, the nature of the trade, and the history of its people, but I must pass on with my narrative. Suffice it to say that in an Arabic document obtained by Mr Wallace some years ago, I find that the history of 42 kings of Kano is given, covering a period of 768 years. The manuscript breaks off suddenly, and it is not possible to fix with accuracy the date of the events it records, but the last king is probably identical with the man whom the Fulani ousted, which would carry back the history to 1040 A. D.

THE EMIR'S DUNGEON AT KANO

The dungeon at Kano was an incredible horror. A doorway 2 feet 6 inches by 1 foot 6 inches gives access into it. The interior is divided (by a thick mud wall with a similar hole through it) into two compartments, each 17 feet by 7 feet and 11 feet high. This wall was pierced with holes at its base, through which the legs of those sentenced to death were thrust up to the thigh, and they were left to be trodden on by the mass of other prisoners till they died of thirst and starvation. The place is entirely air-tight and unventilated, except for the one small doorway, or rather hole, through which you creep. The total space inside is 2,618 cubic feet, and at the time we took Kano 135 human beings were confined here each night, being let out during the day to cook their food, etc., in a small adjoining area. Recently as many as 200 have been interned at one time. As the superficial ground area was only 238 square feet, there was not, of course, even standing room. Victims were crushed to death every night, and their corpses were hauled out each morning. The stench, I am told, inside the place when Colonel Morland visited it was intolerable, though it was empty, and when I myself went inside three weeks later the effluvia was unbearable for more than a few seconds. A putrid corpse even then lay near the doorway. Even the memories of the Black Hole of Calcutta can not eclipse this plain statement of the state of things in a British protectorate in the twentieth century, of which, in general terms, I have long been aware. One of the great pools of the city is marked as the place where men's heads were cut off at the arbitrary order of the king; another, near the great market, is the site where limbs were amputated almost daily for theft or some less real crime.

THE BRITISH ADMINISTRATION

The aim of our government has been to rule through the native chiefs, and, while checking the extortionate levies of the past, to fairly assess and to enforce the ancient tribute. By this means a fair revenue will be assured to the emirs in lieu of their former source of wealth, which consisted in slaves and slave raiding and in extortionate taxes on trade. A couple of years ago there was not, I suppose, in Africa any country in which slave raiding was carried on to the extent which it was in northern Nigeria. Regular armies took the field each dry season, and the country had become depopulated. Ruined towns met the eye in every direction. The currency of the country consisted of slaves and cowrie. All this is now a thing of the past.

The country has been divided into sixteen provinces, coinciding as nearly as may be with existing emirates and tribal divisions. Each resident-in-charge will be assisted by two political officers and

a police officer, with fifty native constables, and in most of the provinces there is also a medical officer and a military garrison. With such a staff of zealous and able officers the administration will, I hope, be fairly effective, though it is none too large to deal with all administrative questions, to collect revenue, compile statistics of population, etc., to carry on the judicial work of the British courts and to supervise the native courts, to carry out the surveys, to superintend the road-making and other public works, and to develop the economic resources and trade.

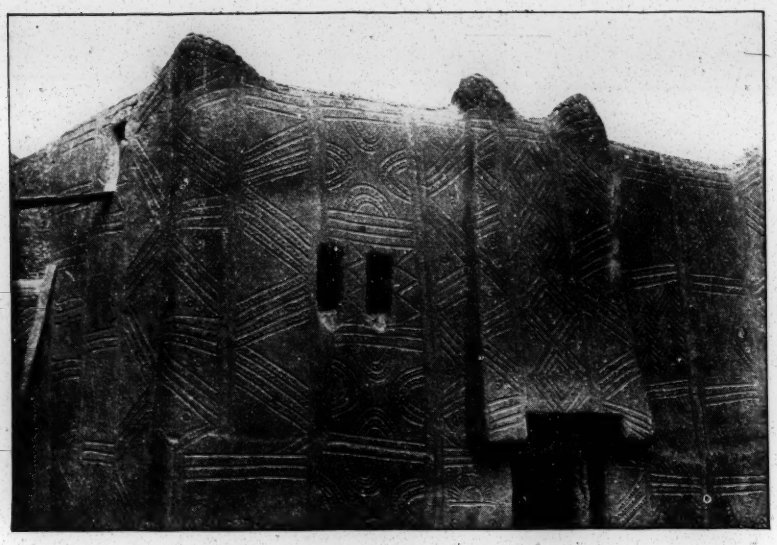
THE PEOPLE OF NIGERIA

The Mohammedan Fulani, though the ruling race, form but a very small item in the population of northern Nigeria. The indigenous people, who are subject to them, are of many different tribes. In the northern states of Sokoto, Kano, Zaria, and Hadeija they are chiefly Hausas. South of these are the great Nupe tribe, and south again in Illorin are the Yorubas. Of these the Hausas are the most considerable. They are found as settlers and traders in every province, and even as far as Sierra Leone and the Gold Coast. Their language is the *lingua franca* of northern Nigeria, especially of trade, and their keen commercial instincts have earned for them the name of "the business men of west Africa." They make admirable soldiers and are brave and reliable, but probably inferior in mental ability and alertness to either the Nupes or Yorubas. The latter are hardly less keen traders than the Hausas, at least equally industrious and much quicker to learn, though hardly equal to them in stolid pluck. The Nupes are the finest of the three in physique and very intelligent, but they have not the pluck of the others, and their ability is apt to degenerate into cunning treachery and falsehood. These tribes have to some extent embraced the faith of Islam, especially the Hausas. There are other great tribes who are pagans.

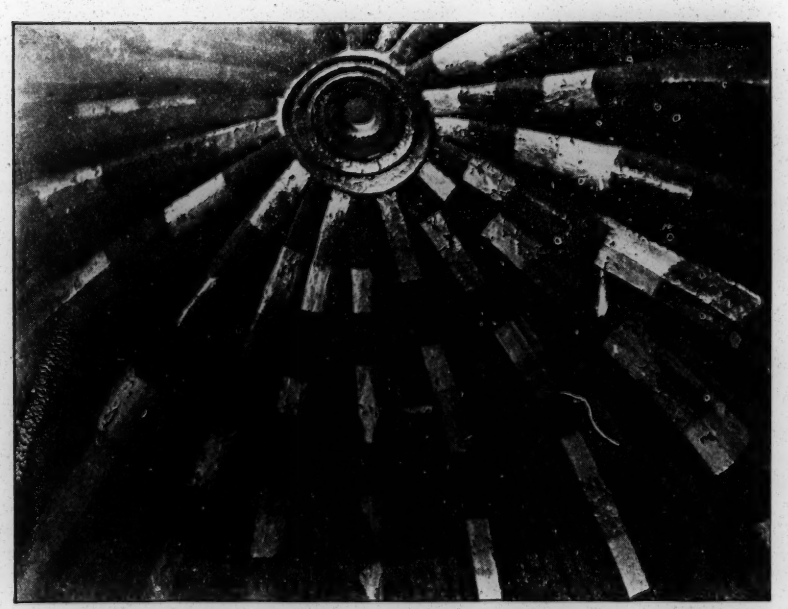
CLIMATE AND HEALTH CONDITIONS

Nigeria is a land of tornadoes. Toward the close of the dry season—end of February—cyclones from the northeast, usually accompanied by storms of thunder and rain, burst with great fury. Increasing in frequency, they merge into the heavy rains which last from July to October. With the cessation of the rains the whole Sudan presents a vista of grass fires, and the Hamattan wind begins to blow from the northeast. The clear atmosphere of the rainy season gives place to a thick haze, which like a London fog obscures the whole horizon, and objects only a few hundred yards distant are indiscernible, so that surveying is difficult. The sun disappears like a crimson disk about 5 p. m., behind this pall of haze, which consists chiefly of impalpable dust. The so-called Tuareg "veil," and the habit of wearing the pugari over the mouth and eyes, is adopted as a protection against this dust. The wind itself blows intermittently for several days with violence, and anon with moderate force or abates altogether, but always from the same quarter, especially betweem 8 a. m. and 4 p. m.

The Hamattan is the herald of cold nights, and in the northern states even during the day, in the months of January and February, the cold is often quite trying. The excessive dryness of this wind from the desert of the Sahara causes an evaporation when it meets the wall of humid atmosphere in the Niger Valley and produces these effects of cold. Where the lakes around Timbuktu and the waters of Chad impinge on the desert, I am told that frost is not uncommon. These cool nights add to the health and comfort of Europeans, and though the Niger Valley is undoubtedly trying I think that the health conditions of the interior are good, and will im-

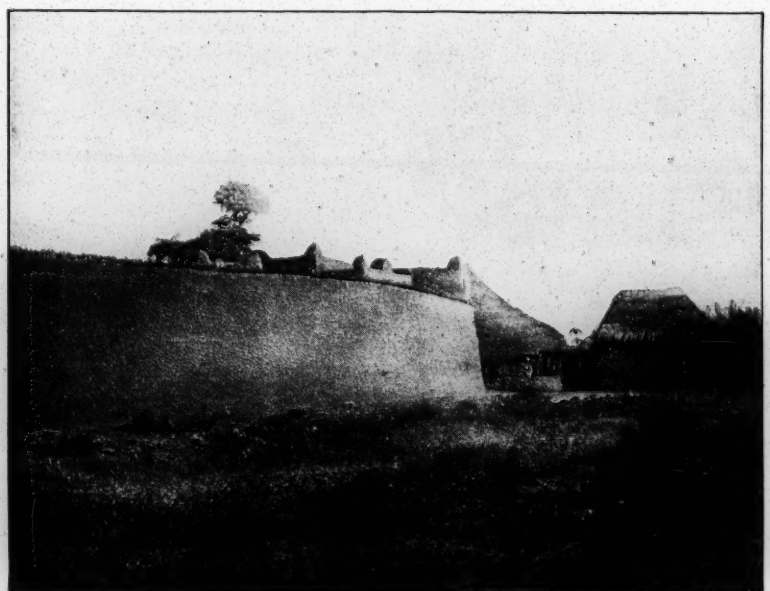


Exterior of the Emir of Kano's Harem



Ceiling of the Emir of Kano's Audience Chamber

View Inside Zaria

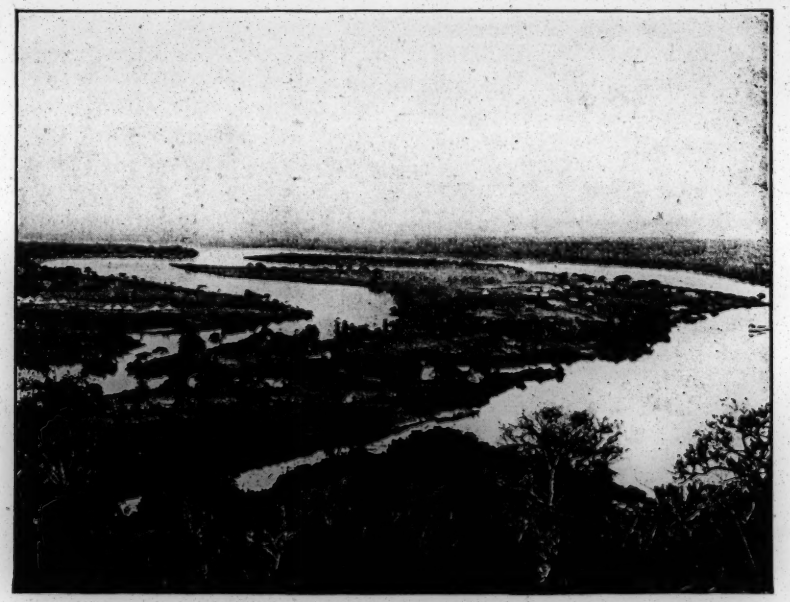


Wall of Emir of Zaria's Compound

prove greatly as our resources enable us to build proper houses and to transport the necessaries for European life and comfort. *Even what we have already been able to do has reduced the mortality from 32 per cent in 1898 to 6 in 1901; deaths and invalidings, 87 per cent to 34 per cent.*

DISAPPEARANCE OF LAKES AND RIVERS

But other causes still, besides the sand-bearing Hamattan and the deforestation of the country, are at work to effect the diminution of the rivers and the lakes of Africa. Lake Ngami, whose waves were so great that they are said to have dashed hippopotami to pieces when Livingstone discovered it in 1850, was when I lived near it in 1896 only a dry bed of the smouldering ashes of lacustrine vegetation, while the Home River and the upper Botletle were both dry and their channels hardly distinguishable. In every direction were abandoned wells. Year by year they had to be deepened to catch the failing supply of water, till it ceased. Three times in a few years had the chief of the Tawana to shift his capital because the apparently inexhaustible supply had wholly failed at each turn. In Nyassaland, as I have pointed out in former writings, the old surface level of the lake may be seen far inland today, and it is possible to trace various different levels on the surface of the water-worn rocks; and so it is in West Africa.



View of the Niger from Jebba

Yearly the Niger becomes less navigable. Where steamers drawing 8 feet could ascend within the memory of Mr Wallace (now deputy high commissioner), 3-feet vessels can now with difficulty make their way for a much more limited period. As the lips of the rapids and waterfalls are worn away in the course of time and the obstructing rocks are eroded, the rivers will, of course, run off their volume of water more rapidly to the sea; but this is a process of ages,

and it remains to assign the cause for so great a decrease in the rainfall or such other causes as may have combined to produce these results.

COMMERCIAL POSSIBILITIES

The great need of the country is transportation facilities. If a narrow-gauge tramway was built connecting the interior with the great waterways, Nigeria might become one of the cotton-producing centers of the empire, and her great population might afford a new and important market for the manufactured cottons of Manchester. Without such cheap transport, however, neither cotton nor other agricultural or sylvan produce can bear the cost of carriage from the interior, where the bulk of the industrious population live.

The principal exports at present are shea, rubber, palm kernels, ivory, gum and wood oils. The imports are chiefly cottons and salt, since liquor for sale to the natives is entirely excluded.

If a cheap form of transport was introduced, the existing imports, at present simply wasted for lack of transport, might be almost indefinitely increased, and many new products could be profitably exploited. Prominently among the latter would be cotton, for which there is so great a demand in England and which has been grown for 1,000 years in the Hausa states. Minerals, too, will soon become a profitable source of revenue. The mines at Bauchi have proved to be of the highest quality, and they are now being exploited by the Niger Company.

The local industries and manufactures are varied, and the products are often of high excellence. The weavers of Kano and the other great cities produce admirable cloth, colored by the native dyers with their own fast dyes. The leather work is admirable, and the tanned goat skins exported from Kano across the desert to Morocco were the original Morocco leather of commerce.

SCIENTIFIC WORK OF MOUNT WEATHER METEOROLOGICAL RESEARCH OBSERVATORY*

BY PROFESSOR FRANK H. BIGELOW, U. S. WEATHER BUREAU

METEOROLOGY has for its field of study the physics of the earth's atmosphere. Since all stellar and planetary atmospheres are subject to similar laws, meteorology properly is concerned with astrophysical and solar physical problems as well as with terrestrial atmospheric relations. Cosmical meteorology may be used as a term to designate the mutual relations between solar and terrestrial atmospheric physics. The causes of the circulation of the earth's atmosphere are intimately bound up with the causes of the circulation of the sun's atmosphere. The generation of the great cyclonic circulation in the earth's atmosphere covering a hemisphere is due to the sun's radiation falling upon the tropics, and the tendency to return to a thermal equilibrium is accompanied by the production of local cyclones and anticyclones in the middle latitudes of the northern and southern hemispheres. Similarly, the sun's own circulation can be divided into a general drift over the hemisphere and

* An address to the Eighth International Geographic Congress.

a series of minor or local gyrations in different latitudes. We have shown in a paper that three aspects of one common law of general motion are mathematically competent to account for the three typical drifts, within which the local storms occur as secondary phenomena. The solar energy pours forth in several types of radiation, and these are accompanied by various kinds of surface phenomena which are subject to our observation. Their interpretation is to be made in terms of the general solar action, and they are to be treated as pulses or symptoms of the great operations inside the solar surface, whose laws can be discovered only by inference and mathematical analysis. The immediate signs of the internal solar action are the frequency of the occurrence of the black spotted areas which vary from year to year, the relative abundance of the faculæ and the flocculi, the granulations of the photosphere, the numerical frequency of the hydrogen and calcium prominences which are projected to considerable distances above the disk, and in the form and extent of the solar corona. We now know that the period of rotation in different zones and the frequency of all these phenomena vary from year to year in at least three fundamental cycles, whose lengths are respectively about thirty-five years, eleven years, and three years. The records disclose two or three thirty-five-year cycles, more than twenty eleven-year cycles, and a great number of three-year cycles. We have in hand the typical annual curves of these in about all the phenomena mentioned, and they certainly constitute a single homogeneous system, as they apparently ought to do, since they are various kinds of registers of the same solar action.

Beyond the surface of the sun there are several types of radiation which transport the solar energy into distant cosmical spaces. The most conspicuous is the electro-magnetic radiation, whose energy is practically confined to wave lengths from 0.35 μ to 2.50 μ, of which the waves up to 0.8 μ are visible, while all the others are invisible to the human eye. The other waves, ultra violet and infra red, are detected through appropriate physical observations, by photography, bolometry, and by spectroscopy. There are also generated at the surface of the sun certain electrical radiations, like the cathode rays in a vacuum tube where positive and negative charges of electricity are transported by jons into space, and these are seen in the long coronal streamers, possibly also in the zodiacal light at the earth. There are weighty reasons for thinking that the sun, like the earth, though having a very high interior temperature, yet sustains a magnetic field which embraces the earth in its operations.

At the earth the effect of these solar forces is registered by the changes observed in the aurora and the magnetic elements. The solar annual curve, which is conspicuously found in the prominences, is reproduced in the earth's magnetic field. It is also found in various portions of the earth to reappear in the barometric pressure and temperature, in the rainfall and the intensity of storms. This signifies that the changes in the internal circulation of the sun reach over to the earth and induce synchronous changes in the circulation of our atmosphere. The several impulses mentioned, whether solar or terrestrial, throughout which this synchronism has been traced, are merely symptoms of the great cosmical circulation extending from the sun out into space and involving the planets more or less vigorously. The earth is near enough to the sun to feel the changes of the solar circulation in a very definite manner. There are a few hundredths of an inch of annual pressure involved and two or three degrees of temperature are concerned.

When we consider that the annual values are made up of a great number

of short oscillations of the atmospheric conditions at a station, we have the means for interpreting them in terms of climate. The amplitudes of the pressure and temperature oscillations change decidedly from one year to another, and we note the result popularly by the fact that one winter is cold and the next warm, one summer dry and another moist. These practical results are always accompanied by certain changes in the normal conditions—that is to say, their departures from the normal or average state of the temperature. We now know that some countries are favorable and some unfavorable for recording the solar variations in terms of meteorological changes. Generally the plateau and mountainous regions are not as well adapted as the low-level or oceanic areas to feel this solar impulse without mixing it up with the other motions of the atmosphere and burying it in them. Thus Asia is not favorable, Europe and Africa are somewhat better, while North and South America, the Indian Ocean, and Australia are the most sensitive areas for making the records. The small ocean islands, Mauritius, Azores, Hawaii, etc., seem to be most suitable for this solar registration. This is, no doubt, due to the fact that the ocean-island climates are less disturbed than the continental, where the mountain ranges exercise a great influence upon the circulation of the lower strata of the atmosphere. Thus the Himalaya Mountains, stretching east and west, shield the continent of Asia from cyclonic action, while the Andes and the Rocky Mountains, stretching north and south, are favorable for producing local storms in North and South America. The Indian Ocean records the solar impulse by reason of the quiescence of the atmosphere over it, while the United States records it in another way by reason of the activity of the circulation traversing it. This region has many more storms than other portions of the earth, and that is why meteorology has a special duty to perform for science in the United States by reason of its active field, which favors a proper study of the fundamental problems.

Enough has been accomplished in the way of establishing the fact of this solar-terrestrial synchronism to justify scientific men in all portions of the earth devoting their best energies to a further elucidation of all the facts. The range of work is enormous, since it involves so many lines of correlated subjects in solar physics, terrestrial magnetism, and meteorology.

The International Meteorological Committeé is about to organize a strong attack upon the cosmical problem by enlisting the coöperation of observatories in these several fields of work, both as to the method of observations and the mode of computation and publication. This alliance between solar physics and meteorology is most desirable, and there is little doubt that the foundations will be laid for a great practical science, whose outcome, we hope, will be an ability to forecast the seasonal conditions at least approximately from year to year. The benefits to be derived by the American public from a fair knowledge of the probable kind of seasons to be expected in the several portions of the country is so obvious that a generous support of the scientific work required to reach this result will seem not only permissible, but most important. How rapidly a practical conclusion for such studies can be reached will depend almost entirely upon the facilities placed at the disposal of the Weather Bureau by the government. It will require able students to handle the technical problems and many workers to carry out the details of the observations and make the necessary computations. The Secretary of Agriculture and the Chief of the Weather Bureau have been making preparations for this work by founding

a research meteorological observatory at Mount Weather, Bluemont, Virginia, about 65 miles northwest of Washington. The site contains 85 acres of land, located on the crest of the Blue Ridge Mountains, 1,800 feet above sea-level, and overlooking the Piedmont and the Shenandoah valleys. It is far enough away from any probable trolley line, such as one through the Snicker's Gap, to escape the electric currents which might injure the magnetic observations. The rocks are non-magnetic to a remarkable degree, and the magnetic field is uniform, so that the place is a good one for the observatory. We have a large building for administration and common meteorology already completed, a fine balloon and kite plant in process of construction, and operations have been begun on a first-class variation and absolute observatory for atmospheric magnetism. Plans are being studied for an excellent physical laboratory to accommodate experiments in meteorological physics, in the improvement of instruments, in atmospheric electricity, ionization and radioactivity of the air and of soils, and other research investigations. We are working out a comprehensive scheme for a solar physics observatory for studying the visible signs in the sunspots, prominences, faculæ, and photosphere by a photographic telescope, a horizontal spectro-heliograph, and a spectrum analyzer; also, it will contain a high-grade bolometer if the site proves sufficiently favorable for this line of radiation observations. There are numerous small pieces of auxiliary apparatus which will be developed and added as time and experience suggest.

To coördinate and organize so large a scientific plant will require time and money, but it is felt that we can in no other way suitably serve the American public in this branch of science. While there is similar work of the kind going on in different parts of the world, it is not possible for us to make use of it in practical forecasting. Except for some preliminary notices of results to be found in current scientific journals, the published reports are usually delayed two or three years behind the date of the observations. Furthermore, coming from so many sources, different countries, and different observers, the data are not homogeneous. It takes so much time and labor to work over and render comparable this miscellaneous material that it is better to bring all the necessary lines of study under one management and make the observations and computations homogeneous from the beginning, so as to keep the data in form for immediate deductions regarding the trend of the general meteorological conditions in the United States. We are looking to the future needs of a rapidly developing and intensely interesting branch of science, and are trying to build the very best observatory possible. We shall seek to equip it with the most satisfactory instruments which are available. There will be no haste in order to reach sensational forecasts, and it is believed that the public will indorse the strictly scientific method here outlined.

SOME FACTS ABOUT JAPAN

THE Johns Hopkins University has just published a very comprehensive essay by one of its students, Yukimasa Hattori, entitled "The Foreign Commerce of Japan Since the Restoration, 1869–1900." The author quotes in his opening chapter from that remarkable and historic oath of the Emperor, given April 6, 1898, on the happy restoration of imperial authority: "The uncivilized customs of former times shall be broken through. . . . Intellect and learning shall be sought for throughout the world to establish the foundation of the Empire." As Mr Hattori says, "Nothing will perhaps better illustrate the spirit of the times than this terse sentence, by which the long-established social and political institutions were condemned" and an era of commerce with nations inaugurated.

The essay consists of 79 printed pages, divided into three parts: (1) discusses the volume of trade, the text being supplemented by diagrams showing graphically the great increase. The author believes that the balance of trade for the period ending with 1900 was even; (2) describes the character of Japan's commerce; (3) explains the geographical distribution of the trade. England is losing her leading position. The share of Germany does not even yet amount to one-half that of England, but the German merchants are prosperous and energetic, and more and more of the English trade in Japan is passing into their hands.

The American imports have made the most remarkable increase. In 1895 the total value of Japan's imports from the United States was only 9,000,000 yen. In 1900 it had increased to the enormous sum of 62,000,000 yen. This rapid increase, however, is largely due to raw cotton, though the imports of manufactured goods also increased at a great pace.

WEALTH OF COAL

According to the estimate of Henry S. Munroe, the total coal-bearing area of Japan amounts to about 5,000 square miles, while the average thickness of veins is 15 feet. The coal product of Great Britain, it has been estimated, is equivalent to the labor of 133,000,000 operators working without wages for her enrichment. Japan, says Mr Munroe, has now, in the Ishikari field alone, stored up, and available for at least two centuries' use, the labor of an equal body of men. But it may be very much doubted whether this report of Mr Munroe is not somewhat exaggerated. Though a more recent careful geological survey has been made, it seems that the extent and amount of deposits can not be ascertained with precision. In 1899 the number of plants for mining coal was 2,108, covering an area of over 318,644,670 tsubo (1 tsubo = 0.03306 acre) and having a total estimated supply of 1,593,000,000 tons of coal. At the present rate of consumption, which amounts to some 9,000,000 tons (viz, 4,000,000 tons for export and 5,000,000 tons for home use), this supply will, roughly speaking, last about one hundred and seventy years.

COTTON SPINNERS

In view of the rapid growth of the cotton-spinning industry in Japan, from 70,000 spindles in 1885 to 1,088,000 spindles in 1900, it is interesting to consider at what economic advantage or disadvantage the Japanese spinner is competing with his rivals in Manchester and Bombay. It is said that the proportion between hands and spindles is three or four times as great in Japan as in the English factories, though the evidence is by no means conclusive on this point. The proportion of operators to spindles is practically the same in Japan as in India, being about one workman to

thirty spindles. In deftness and delicacy of touch Japanese operators have no rivals, but the Japanese industry is handicapped as yet by the scarcity of skilled labor. This disadvantage is, however, counterbalanced by the longer working hours of the Japanese mills, which work twenty-three hours out of twenty-four with two shifts of operators, and consequently their production per spindle is 40 per cent greater than the production at the Bombay mills and nearly double the production at English mills.

Another, and by far the most important, factor is the low rate of wages. In 1900 wages were 9 cents per diem (American gold) for men and 5 cents for women in Japan, while in the same year they ranged from $1.34 to $1.68 in England and from 13 to 35 cents in India. It will thus be seen that the wages of the Japanese spinners are far lower than those ruling in India. Though it is a false notion that low wages in themselves are sufficient to establish Japan's yarn trade, there is no gainsaying the fact that the rate of wages has much to do with the determination of the cost of production. The scarcity of capital and the consequent high rate of interest, which ranges ordinarily from 8 to 10 per cent, and sometimes even as high as 12 per cent, is a drawback. But this is offset by the longer working hours of the Japanese mills and the consequent larger production of yarn per spindle. Whether the mills are run at night or not, the cotton-spinning companies have to pay the same rate of interest.

RICE AND THE FOOD SUPPLY

It is undeniable that Japan has almost reached the maximum in her production of rice. Of late years, even under the most favorable circumstances, the Japanese crops have not sufficed to feed the growing population without the importation of foreign supplies. Every inch of the arable land of the country has been brought under cultivation by the labors of many centuries, and even the mountains are often cultivated to their highest summits, manure being laboriously carried up on human shoulders. Under these circumstances, there is at present no prospect for any large extension of cultivable soil, with the exception of Hokkaido, the northernmost island of Japan, a great part of which still remains untouched. However primitive be his method of cultivation, *the Japanese farmer understands his work so thoroughly that, by elaborate means of irrigation and the skillful use of fertilizers, he has been able to obtain rich harvests from the same land during fifteen or twenty centuries.* It will thus be inferred that agrarian improvements in the direction of more scientific processes of intensive cultivation would hardly afford much relief, especially in view of the fact that the population of Japan is increasing at the rate of 400,000 souls per annum. It is quite evident that at no remote time Japan will be compelled to rely for her means of subsistence upon foreign lands.

Agriculture, however, is still the fundamental basis of Japan's industrial life. To this industry the country owes its ability to pay its way, and but for the peasant farmer, who, by a more or less cheerful acquiescence in the imposition of a land tax, made it practicable for the newly formed central government to carry on the task of administration on a Western model, it is difficult to see where the resources could have been found for the consummation of so vast a change as that which has occurred within the last thirty years. The Japanese farmers toil hard throughout the year, but their profits are small compared with those derived from other kinds of business. Farmers consequently are constantly forsaking their holdings for other lines of business. The result is a net gain to the country as a whole. Work is applied in directions which give a greater return to the individual and to the country.

According to an investigation recently made, Chinese rice can be bought at half the price at present prevailing in Japan, and but for the existence of the Chinese "corn law," which prohibits any exportation of rice, Japanese agriculture would have suffered much more rapidly and seriously. The competition of China, where vast tracts of land are still left uncultivated and where the price of rice is cheap, must be expected sooner or later, and then a serious fall in the price of Japanese rice will set in, causing a series of agricultural changes.

Japan can not hope to compete in agricultural productions with those countries which have immense territory. Hence Japan must rely on industrial development rather than on agriculture, and must strive to excel in the quality of goods produced rather than in quantity. The examples of Egypt with its cotton, Italy with its rice, France with its silk, and England with its wool and sheep may well be cited as cases of countries the limited area of which does not allow them to compete with vast countries in the quantity of agricultural productions, but which in the quality of their respective staples distance all competitors. Japan possesses all the advantages necessary to make her a great manufacturing country. Her people possess exceptional skill and labor is relatively cheap; coal is abundant, and the raw material is easily obtainable either at home or in the neighboring countries.

SOME PECULIAR FEATURES OF CENTRAL AFRICAN GEOGRAPHY

FOR about ten degrees south of the equator in central Africa, in the southern part of the Kongo Valley, one is struck by the fact that the rivers, streams, and lakes are usually bordered with a dense vegetation, which extends out from the water a distance proportioned to the extent of the surface of the water. Adjacent hills and mountains are often found covered with dense vegetation on one side, and are bare on the other. Beyond this bordering vegetation are found vast plains, almost treeless or with small scrub growth and coarse, thin grass. Where the interior is not level the hills are also bare of large trees or heavy vegetable growth.

This condition may be explained by reference to several facts. For the months from May to October there is a dry season, when scarcely any rain falls at all. The days are hot, but the nights are cool, the thermometer often reading 50° F. There is a heavy evaporation from the waters during the day, followed by condensation into dense fog at night. This fog spreads out on the adjacent sides of the waters and moistens the surrounding territory, thus taking the place of rain and causing a luxuriant growth wherever it occurs. The usual morning winds blow the fog against the exposed sides of hills and mountains and up the valleys of tributary streamlets, acting on the soil so dampened like summer rains. Where the fog is not borne the country is dry. The natives often shave off the hair from one side of their heads, the effect presenting the same appearance as the hills of their country.

If one marches parallel with the rivers and within the range of these fogs and winds, he must pass through tremendous forests. If he gets out of this range he can march parallel with the same streams but over open plains or hills and mountains with only a sparse vegetation.

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THE GLACIERS OF ALASKA

THE rapidity with which the Alaskan glaciers are changing, some retreating and others apparently advancing, gives special value to the careful record of their present character contained in "Alaska; Glaciers and Glaciation,"* by Dr G. K. Gilbert. Dr Gilbert states that Nunatak Glacier between Professor Russell's visit in 1891 and his own visit in 1899 retreated fully a mile and possibly twice as much; Muir Glacier between 1880–1899 retreated 1½ miles, and since the earthquake of 1899 has retreated about three miles. On the other hand, other glaciers, like the Columbia and La Perouse, are now probably at their maximum, having been much smaller during the past 100 years.

While it is impossible to say absolutely why certain glaciers are diminishing while others a short distance away are increasing, Dr Gilbert suggests that the cause may be a change in the meteorologic conditions. The glaciers are different, some being fed by open névé fields and others by cirques. A rise in ocean temperature probably increases the wastage of the former class, but, on the contrary, enlarges the latter class by an increased fall of snow and rain, which more than counterbalances the wastage.

"Nearly all the glaciers of Alaska are comprised within a belt of moderate width which follows the southern coast from the Aleutian Islands to Portland canal. Curving about the great bight of the Pacific Ocean known as the Gulf of Alaska, this belt has a length of 1,600 miles, and its extreme width, near the middle, is about 250 miles. Within it the arrangement of glaciers is irregular, but their more important groups occupy the middle region, while near the ends they are comparatively sparse and small.

"The explanation of this massing of glaciers along the southern coast is not far to seek. The general circulation of the Pacific Ocean brings to the Gulf of Alaska a current of water which has been warmed in the tropics and still retains so much heat that its mean temperature is considerably above the normal for the latitude. The ocean is therefore, at some seasons, warmer than the contiguous land, and though air currents passing from ocean to land convey heat to the land they are themselves cooled. While traversing the ocean the air becomes loaded with moisture, the cooling over the land diminishes its water-carrying capacity, and part of its load falls to the ground as rain or snow. Moreover, all this coast is mountainous, so that landward flowing air is compelled to rise, and its capacity is still further reduced by rarefaction. At the greater altitudes the ratio of snow to rain is comparatively large, and the mountains thus become gathering grounds for the snows that feed glaciers. Farther inland the air currents descend somewhat, and the precipitation is diminished until the conditions for glacier formation cease. Hayes states that while the névé line of glaciers on the southward face of the St Elias Alps lies at about 2,000 feet above sea-level, its altitude on the northern face is over 6,000 feet.

"Along the western coast of Alaska the conditions are different. Bering Sea lies practically outside the influence of the Pacific circulation, and the temperature of its water is approximately normal. Its power to change air currents with moisture is small, especially in winter, and though the winter temperature over the adjacent land is low the snowfall is heavy. There are no great mountain ranges to concentrate

* "Alaska; Glaciers and Glaciation," by Grove Karl Gilbert. Vol. III of the Harriman Alaska Expedition Series. Edited by Dr C. Hart Merriam. With 18 maps and plates and 108 illustrations in text. Pp. 230. 5 by 10½ inches. New York: Doubleday, Page & Co. 1904.

the precipitation, and the snow of winter being broadly spread over plains or caught by ranges of a moderate height is dissipated by the melting and evaporation of summer.

"The glacier-bearing belt includes about three-tenths of the vast territory of Alaska. Its exploration has but begun; yet enough is known to give it rank as the third great glacier district of the world, only the Antarctic continent and Greenland surpassing it. Its ice may be roughly estimated to occupy a tenth of the surface, or an absolute area of between 15,000 and 20,000 square miles, and this expanse is so divided and scattered as to offer to the student the utmost variety of local condition and detail. Of alpine glaciers, such as would receive individual names if near the homes of men, there are many hundreds, possibly more than a thousand; of broad, composite fields, like the Muir and Malaspina, there are about half a dozen, and more than thirty are known to reach the coast and cast bergs into the sea."

In the summer of 1899 the Harriman Alaskan Expedition on board the *George W. Elder* sailed for hundreds of miles along the Alaskan coast, obtaining splendid panoramic views of the glacier systems. Opportunities for close examination included landings from the ship at thirty-four localities, at three of which the use of a camping outfit extended the time to several days. The remainder of the two months covered by the voyage was spent on the ship, and about half the sailing time was so conditioned by distance from shore, by light, and by weather as to permit profitable observation of the coast. After the voyage was over physiographic studies were continued by the aid of photographs. Thousands of views by members of the expedition were examined, as well as a large number from other sources, and several hundred of these have yielded information as to glaciers and glaciation.

The results of all these observations appear in the present volume. The magnificent series of panoramas, maps, and illustrations accompanying the text give the work unusual permanence and value. The volume, like the others in the Harriman Alaska series, is ably edited by Dr C. Hart Merriam.

GOVERNMENT ASSISTANCE IN HANDLING FOREST LANDS

THE forest lands of the United States are owned in three separate ways: First, by the Government of the United States, to which belong the reserved and unreserved forests of the public lands; second, by some of the states, and, third, by private owners, among whom are individual men, companies, and institutions.

The private forest lands exceed in area those of the states and the federal government combined, and their preservation in productive condition, as regards both timber and water supply, is of vast importance to the nation. As a rule, however, the treatment they receive tends to destroy their value rather than to sustain or increase it. The reason is evident and natural. These lands, like other private property, are held by the owners for the returns they yield, and the owners as yet have scarcely begun to understand that it pays better, as a rule, to protect a forest in harvesting the timber crop than to destroy it. A knowledge of how to bring about the desirable result is still more restricted, while trained men capable of advising forest owners in the matter are very few indeed.

GOVERNMENT COÖPERATION WITH FOREST OWNERS

Forest lands in private ownership are mainly of two kinds, small holdings, for the most part farmers' woodlots, and larger areas, chiefly valuable for lumber. The Bureau of Forestry is prepared, so far as its appropriations will permit, to lend its aid to the owners of each kind, on receipt of applications stating the situation, area, and character of the forests for which working plans are desired.

Applications will be considered in the order in which they are received, but precedence must be given to the lands most likely to furnish useful examples. A working plan once prepared will not be put in effect unless it is satisfactory to the owner.

The conditions upon which the Department of Agriculture, through the Bureau of Forestry, will undertake investigations and give assistance are stated in the agreement, and provide that a preliminary examination, if necessary, shall be made wholly at the charge of the department, and that if no further study is required final recommendations for management shall be made without cost to the owner. Advice, therefore, for those small tracts which do not require detailed study will be given without expense to the owner. As further stated in the agreement, the cost to the owner of working plans for tracts requiring detailed study will be based upon the actual cost of the necessary study on the ground, but may be reduced in consideration of the usefulness of the work as an example in practical forestry.

Tracts of any size, from five acres up, are eligible.

WOODLOTS

Throughout a very large portion of the United States nearly every farm has a certain part of its area under wood, either planted, as in regions otherwise treeless, or of natural growth. The value of this wooded portion, besides affording protection from the wind, is chiefly for fuel, fencing, and railroad ties, with some building material, and the wood needed for special uses about the farm. Without the woodlot a farm very often would be an unprofitable investment, because the farmer could not afford to buy the wood, which now costs him very little except the labor of cutting and moving it. Indeed, in very many cases the woodlot keeps the farmer going. His labor there during the winter, when otherwise he would be idle, makes up for any deficit in the cultivated land, and the ready money he receives from the sale of fuel, ties, or other material is indispensable to his comfort and prosperity.

In two directions, then, material and money, the product of his woodlot is of high importance to the farmer. But in the majority of cases this part of the farm is far less useful than it might easily be made. This is true because the farmer does not study its productive capacity as he does that of his fields and pastures, and hence does not make it yield as freely as he might, with little or no additional labor, if he went about it in the right way.

TIMBERLANDS

Large bodies of forest land in almost every wooded portion of this country have come into the hands of private owners, and are held by them chiefly for their value as sources of timber. Much of this land, probably the greater part of it, is in hilly or mountainous regions, where the preservation of the forest is of importance for both wood and water, while the destruction of the lowland forests, except when they give way to agriculture, would bring with it the loss of a plentiful spring of national wealth.

The harvest of the timber crop on these private timberlands is commonly accompanied, under the usual methods of lumbering, by the destruction of the forest when merchantable trees predominate, and in any case by severe and needless injury. Fire follows the lum-

berman, in spite of the precaution he very often takes, until in many places it is thought to be inevitable. These are misfortunes from which the owners of the forest land are the first but not the only losers, for in the aggregate the loss is of immense public concern. It is to prevent these public and private losses that the Bureau offers its assistance, realizing fully that they must continue until the success of some of their number proves to the great mass of timberland owners that improved and conservative methods of lumbering will pay.

GEOGRAPHIC NOTES

PROBLEMS OF THE FAR EAST

ONE of the most valuable contributions to the understanding of the world questions of the Far East is a series of four monographs prepared by Hon. O. P. Austin and published by the Bureau of Statistics. The titles of the four are: Commercial Russia in 1904, Commercial Japan in 1904, Commercial China in 1904, Commercial Korea in 1904. Each report contains an outline map and includes the most authentic consular reports and other documents bearing on the Far East. As far as a limited edition will permit, the Bureau of Statistics gives the series to applicants.

OUR CLIMATE HELPS US

THE United States has an advantage over other countries in its climate. The sweep of the cold wave brings down some of the high potential in the upper air, which acts as a tonic but leaves no reaction. This theory is advanced and explained by Dr Willis L. Moore, Chief U. S. Weather Bureau, in a bulletin entitled "Climate."

"Climate is the most potent of any factor in the environment of races. It is climate and soil plus heredity and form of government that produce either vigorous or weak peoples. In this respect it is a question if the United States does not possess a constant potential that, all other conditions being equal, places it in a class by itself. . . .

"The sweep of the cold wave, as it is known in the United States, is quite distinctly North American. Nowhere else on fertile plains, unless it be in Russia, does the temperature show such wide oscillation within such short periods of time, nor do the icy blasts sweep over such a broad area. It is probable that much of the physical and the intellectual energies that have caused the United States to excel in agriculture, in manufacturing, and in commerce were produced by the invigorating effect of the cold, dry, highly electrified air of the North American cold wave. The anticyclonic systems of air that constitute cold waves have a marked downward component of motion. This motion brings from a considerable altitude to the surface of the earth some of the high electrical potential of the upper air, which is strongly stimulating to man and to other forms of animal life. These cold north winds have a much greater specific gravity than warm and humid winds, and this condition, added to the force with which they come, scatter and diffuse the befouled air near the surface of the earth."

THE LAND OF EARTHQUAKES

About 1,400 earthquake shocks are recorded yearly in Japan, the land of earthquakes, says Baron Dairoku Kikuchi in an exhaustive treatise, "Recent Seismological Investigations in Japan," just published for private circulation. The number is not as formidable as it would appear, however, as much less than 50 are sensible. Since 1875 15 earthquakes have occurred suffi-

ciently severe to cause loss of life or serious damage to property. In October, 1891, took place the Great Nuno-Owari earthquake, in which 7,000 people were killed, over 17,000 injured, and nearly 20,000 buildings destroyed. In 1875 the imperial government commenced the systematic observation of earthquakes. Of the 223 large shocks recorded since the earliest times 47 had their origin in the Pacific, 17 in the Japan sea, 2 in the Inland sea, 114 inland, and 43 are obscure.

Baron Kikuchi believes that "the distribution of the earthquake origins in Japan seems to have a close connection with the curvilinear form of the country. They are arranged approximately in two systems, which are respectively parallel and normal to the arc formed by the Japanese islands." Almost all recent earthquakes in Japan, extending over a large area, seem to be "tectonic"—*i. e.*, due to mountain-forming agencies—while in earthquakes accompanying volcanic eruptions the shaking is confined to a comparatively small area.

The Imperial Earthquake Commission, which was founded in 1892, has been watching with special care magnetic disturbances in connection with earthquakes, and has found that such disturbances usually attend or preceded earthquakes. Continuous magnetic observations are now being made in five different places distributed over Japan as evenly as circumstances will allow. As Baron Kikuchi remarks, "this investigation is one of the few means at present available for diagnosing the state of underground stress, and it is a promising one." Other investigations have been undertaken to determine the relation of earthquakes to latitude variation. Determinations of gravity are also being made at properly chosen spots with a view of obtaining more knowledge of the internal structure of the land.

The commission is investigating into the existence of periodic oscillations in bays, gulfs, straits, etc., which oscillations may be the cause of the "tsunami" (tidal waves). If these oscillations are proven and their occurrence understood, it may be possible to predict "tsunami," which have so frequently devastated the east coast of Japan. The commission is also investigating earthquake-proof structures, the best forms for chimneys, piers, columns, bridges, etc.

PROSPERITY IN ARGENTINA

ARGENTINA is now entering upon a period of general progress and legitimate development. The day of revolutions seems to have passed and permanent stability of government to have been established. The State Department has recently published a report by John Barrett, formerly U. S. minister to the Republic, which contains a number of interesting facts about the country.

Argentina has an area of 1,120,000 square miles, nearly one-third the area of the United States and Alaska. This area, except a very small portion, is located in the south temperate zone. It is, therefore, strictly suited to white labor. In this vast extent, however, there are as yet only 5,000,000 inhabitants, while it can easily support 75,000,000. Buenos Ayres, the capital, is one of the most prosperous and beautiful cities in the world, and has a population of nearly 1,000,000. Neither in this city nor in the interior is there any considerable Indian or negro element, such as is found in other South American countries. The population is 99 per cent of white extraction.

The signs of prosperity and progress on every side, not only in Buenos Ayres, but in the provinces, impress the student of economic conditions. Money is abundant, and the banks are overburdened with deposits. The population is growing, but immigration is slow, because of reports of unfavorable conditions of taxes and land purchase or

tenure in the interior, which it is hoped the government will soon remedy.

There are 245,000,000 acres of arable and 235,000,000 acres of pastoral land, and yet only 21,000,000 acres are under cultivation, although the soil is equal to that of Illinois and Nebraska and the general conformation of the land not unlike our central West. The number of land-owners—that is, of farms and ranches, not city and town lots—is only 225,000. Hundreds of individual men in every state or province own each from 75 to 300 square miles of land, which will be ultimately divided up into small holdings and will support a great farming population. In short, the major portion of Argentina is in the same undeveloped agricultural condition as Kansas, Nebraska, and the Dakotas were 50 years ago.

As commerce is often termed the "life blood" of a nation, it is significant that the foreign trade of Argentina (imports and exports) for the year 1903 should have amounted to the remarkable total of approximately $352,000,000, an average of $70 per head—a figure unequaled by any other country. The imports from the United States were approximately $16,700,000, and the exports to the United States $8,125,000. In imports the United States ranked after Great Britain and Germany; in exports after Great Britain, France, Germany, Belgium, Africa, and Brazil.

THE GREATNESS OF OUR COUNTRY

THE value of merchandise entering the world's international commerce is $11,000,000,000 per annum; yet our country, young as it is, furnishes today a larger value of domestic exports entering that commerce than does any other nation. A still greater field and a still greater evidence of our own business activity is found in the measure of our internal commerce, the domestic markets of the United States, which of themselves aggregate $22,000,000,000 per annum—a sum just twice that of the total international commerce of the whole world." This is a quotation from a recent address of Hon. O. P. Austin, who continues:

"Our area, including Alaska, is equal to that of all Europe. Our total domestic exports are practically one and one-half billions of dollars and surpass those of any other nation. Our total money in circulation is more than two and one-half billions of dollars and exceeds that of any other country. Our total wealth is one hundred billions of dollars and exceeds that of the United Kingdom and Germany combined. The gross value of our manufactures is thirteen billions of dollars per annum and equals those of the United Kingdom, Germany, and France combined. Our railroads are two-fifths of the entire railway systems of the world, and our production of cotton, and corn, and wheat, and pig-iron, and copper, and all the chief articles which form the bulk of the world's international commerce exceeds that of any other nation."

Work for the Panama Canal.—Preliminary work for the Panama Canal has made considerable progress during the past year. An engineering force is now constructing a reservoir in the valley of the upper Rio Grande, which will furnish a minimum supply of 2,000,000 gallons a day for the city of Panama; also a distributing reservoir for the city of Panama at Ancon. Surveys, plans, and estimates for a sewerage system for the city of Colon, and surveys and estimates for establishing official grades for the streets of Panama are also being made. About 300 engineers have been busily engaged in making surveys to shorten and improve the line of the canal and to determine sites for dams. The canal commission report as follows in regard to the digging of Culebra cut:

"When we took over the work the French were removing about 25,000 cubic yards a month. We removed in August about 37,000, in September a

smaller amount, because the weather was bad and there were some bad slides, which broke up some of the excavators. We cut the unit cost of excavating material in July to 60½ cents per cubic yard; in August to 50½ cents per cubic yard. During the time Major Black was in charge there the French cost was 79 cents per cubic yard. One month we cut the cost down to 45 cents, but that was due to there being no rock excavations."

A cablegram from Christiania states that the Duke of Orleans has asked permission of the Norwegian government to hire the *Fram*, in which Dr Nansen made his voyage to the Arctic regions, for the purpose of an Arctic expedition in 1905.

Emigration from Italy to the United States. — The Italian Commissioner-General of Emigration has urged the Chamber of Deputies to make special appropriations for those districts in Italy which are sending out the largest number of immigrants. His object is to establish additional schools in the "emigrant" districts in order to teach the illiterate adults to read and write, so that if an illiteracy clause is inserted in our immigration laws by Congress, the number of Italians going to the United States may not be cut down. At the present time the economic welfare of large sections of southern Italy depends, says the Commissioner of Emigration, on their being able to send their extra laborers abroad, particularly to the United States. If the United States should suddenly refuse to admit immigrants who do not read or write, at least half of the Italians aiming for the United States would be unable to enter and would be forced back on their overcrowded homes. It is estimated that in 1901 there were 3,439,014 Italians living abroad, of whom 654,000 were scattered over Europe; 168,000 were in Africa (Tunis, 83,000; Algeria, 39,000; Egypt, 38,000); 745,000 were in North America (729,000 in the United States and 11,000 in Canada), and 1,852,000 were in South America (618,000 in Argentina and 1,100,000 in Brazil).

That Russia is a complete world in herself; that she possesses in her own mines, forests, and fields enough to satisfy her every want; that she ought to manufacture out of these possessions everything that her people need, and that she could do so if her tariff was high enough is the dominant theme of a recent speech of Mr Witte. Consul Monaghan has sent over an abstract of this speech, which contains the following figures to show the present extent of some of her manufacturing industries:

Name of industry.	Number of factories.	Number of employees.	Value of output.
Metal	5,824	758,644	$362,753,125
Textile	4,449	642,520	487,342,440
Food stuff	16,512	255,357	333,779,740
Leather	4,238	64,418	68,009,870
Wood	2,357	86,273	52,982,685
Ceramic	3,413	143,291	42,533,850
Chemical	769	35,320	30,670,825
Paper	532	46,190	23,427,350

Maps of Manchuria.—The German government has recently issued a series of map sheets of Manchuria showing the scene of war. The sheets show in detail the rivers and streams, the mountains and mountain passes, and the roads and trails. The French government has also issued map sheets of the same region. The two series are striking evidence of the confusion of our knowledge of Manchuria and Korea. For instance, the spelling of places is so different that they are almost unrecognizable—*i. e.*, Chemulpo is spelled Tschemulpo on the German map and Tche-moul Po on the French map. Now that all nations are so intimately and jointly interested in world events, they ought to decide on uniform spelling of geographic names.

GEOGRAPHIC LITERATURE

Winter India. By Eliza Ruhamah Scidmore. Profusely illustrated. Pp. 400. 5½ by 8 inches. New York: Century Co. 1903.

The well-known and brilliant author of "Jinrikisha Days in Japan" and "China: The Long-lived Empire," has given a most fascinating description of certain parts of India in her latest work, "Winter India." Though hundreds of books have appeared on the mysterious Indian peoples and their weird customs, practically all the chapters of this latest volume describe scenes that are now told for the first time. One is not surprised that Miss Scidmore, who did not hesitate to penetrate to the Klondike in 1898, succeeded in leaving the beaten track of tourists. In chapter IX she tells of her visit to Buddha-Gaya, where is the Temple of Mahabodhi, the Place of Great Intelligence, and the Sacred Bo-tree. "Not Jerusalem nor even Mecca is held in greater reverence by the millions of Christians and Mohammedans than is Buddha-Gaya by many more millions of Buddhists, who, inhabiting every part of Asia save India, look upon the temple at Mahabodhi as their greatest shrine, to the Sacred Bo-tree beside it as their most holy relic and living symbol, the most venerated tree on earth—Bodhi-druma, the Tree of Knowledge, beneath which Guatama became the Buddha, the Awakened, the Enlightened." And yet the place is rarely visited by tourists.

In chapter XI, "The Greatest Sight in the World," the author describes the worship of the Ganges at Benares. From 25,000 to 50,000 people regularly and on special occasions 100,000 bathers and worshipers, Brahmans of every caste, perform their daily rites in the Ganges. "They sipped handfuls of holy water, rinsed their mouths, lifted the water and let it stream through their fingers or pour back down the arm, facing always to the east, and moving their lips in prayer. They filled their water-jars and poured it over their heads, and they drank it 'to purify themselves,' our mentor said, although one group of purity-seekers stood two feet from the mouth of a rapidly discharging sewer, every sort of city filth floating to their hands and water-jars—the bodies of men and animals and decaying flowers floating by. They drank the pestilent fluid, they carried it home for household use, and bottles were being filled to be sent and carried to the remotest part of India. Western education and sanitary science avail nothing against the Ganges superstition. The British have provided a pure-water supply for Benares, but the people prefer the sacred dilution of sewerage and cremation-ground refuse, thus inviting and encouraging every disease."

"A new India for the tourist will date from the great durbar at Delhi in 1903, and India, which has been a winter preserve for visiting English, will be virtually discovered and opened to a wider clientele, made as possible and fit for luxurious travel as Egypt. Equally this day of cheap travel and cheap living will vanish as completely as on the Nile.

"For one to announce that he will spend a winter in India is hardly more definite or precise than to say that he will winter in Europe. India is a very large country—several large countries—since it equals in area and population all of Europe outside of Russia; and one travels the 1,900 miles of its extent from south to north through as many political divisions as there are great divisions of Europe, and differing as greatly in climate, physical features, and inhabitants. The Spaniard does not differ more from the Laplander than the sooty Tamil from the blue-eyed Afridi, the weak Bengali from the fighting Rajput

or the fierce Sikh. Besides the thirteen provinces under British rule, there are 650 native states; but only 200 of them are of great importance, since native states range in size from Hyderabad, the size of Italy, to single villages in Kathiawar and tiny valleys in the Himalayan foothills, empires two miles square."

In the Uttermost East. By C. H. Hawes. With 40 illustrations. Pp. 478. 5½ x 9 inches. Imported by Charles Scribner's Sons, New York. 1904. $4.50.

All but three brief chapters of this work are devoted to a description of Sakhalin and of the author's experiences during several months passed on the island. Mr Hawes states that the Russian prisons are much improved since George Kennan's visit to Siberia, but that they are still lamentably and unnecessarily harsh. Of the 7,000 prisoners engaged in hard labor on the island, only 70 were political exiles, all the others being condemned criminals.

From a military point of view it commands the entrance to the Amur and could be easily taken; but, as there is no port on Sakhalin to give shelter to vessels, possession to the island would be of little use, excepting for massing troops, say, at Pogobi, for transport in boats in calm weather across the five miles of straits to the mainland.

The island of Sakhalin is 590 miles long and from 17 to 100 miles broad, with an area of 29,336 miles, or a trifle less than that of Scotland, while its population on January 1, 1898, was about 36,000, or scarcely one-eighth of the population of the city of Edinburgh. The native population, excluding all of Russian descent, number about 5,000, of whom 1,500 are Ainus. It is separated from the most northerly of the large islands of Japan, Yezo, by La Perouse Strait, which presents to the mariner a difficult and dangerous crossing, though only 28 miles in width.

It is a mountainous country, a long backbone or ridge running from north to south and keeping near to the west coast, and three spurs stretching to the east coast. The land is for the greater part covered with primeval forest. So dense is this that the natives depend for highway upon the rivers, which they traverse in summer in canoes dug out of tree trunks and in winter in dog or reindeer sledges over the frozen surfaces.

Although it is common knowledge that the farther east of Paris one goes the more extreme is the climate, a fact which Napoleon did not seem to have realized in 1812, yet we should scarcely expect such extremes of climate as a range of 149 degrees of Fahrenheit on an island in the same latitude. There appear to be two main causes. The first is the prevalence of northerly and northwesterly winds in winter and of southerly and southeasterly in summer. The second is the presence of a cold current from the Okhotsk Sea flowing down both sides of the island. The ice, led by the current and driven by the wind from this great reservoir of frost, fills up all the northern portion of the Straits of Tartary, and makes of it a continuation of the subarctic region of frost.

The winter's cold is, however, fine and dry, and though it has been said that Sakhalin does not know the calm days that prevail throughout the winter in eastern Siberia, yet during the latter half of January and the month of February beautiful bright windless days succeed one another on the island, and the dog sledges and reindeer are brought out, and the natives make their journeys for the barter of skins.

In its present undeveloped condition the island presents no great commercial attraction. Japan draws supplies of salted fish from Sakhalin as well as from the Amur, and only in the case of hostilities with Russia would these be endangered. Coal is certainly mined, though not in large quantities, and the

supply is generally thought to be limited. The fur trade is no longer of serious account, and there remains only the petroleum springs, whose true value has not yet transpired. Having regard to its present population of criminals and ex-convicts, the island can not be said to exercise any great allurement.

South American Republics. Part 2: Peru, Chile, Bolivia, Ecuador, Venezuela, Colombia, Panama. By Thos. C. Dawson. With maps and illustrations. Pp. 513. 5½ by 8 inches. New York: G. P. Putnam's Sons. 1904.

Since the first volume was published, describing Brazil and Argentine, and reviewed in this Magazine several months ago, Mr Dawson has been transferred from Rio Janeiro, where he had been the American Consul General for a number of years, to the post of United States Minister to Santo Domingo. This second volume, like the first, contains much more history than geography, very little descriptive of the peoples or of the actual resources of the countries being included. Speaking of the new era which has begun in Colombia since the inauguration of General Reyes, Mr Dawson says: "It will be under his able guidance that Colombia will start on the tedious road leading to internal peace and regeneration, to financial rehabilitation, and to the reconcilement of those fierce factions whose wars have drenched their country's soil with blood for so many decades." With the completion of the Panama Canal, a new era will begin for the entire west coast of South America.

The Kingdom of Siam. Edited by A. Cecil Carter. With 50 full-page illustrations. Pp. 272. 5 by 7½ inches. New York: G. P. Putnam's Sons. 1904.

All the chapters in this exceedingly interesting and handsomely illustrated little volume were written by high officials in different departments of the government service of Siam, and we may therefore accept them as authentic.

Siam equals in size the States of California and Oregon combined and has a population of about 5,000,000. The Siamese are addicted to chewing, but they chew tea, not tobacco. The tea is not used as a beverage, but made into balls of a suitable size to fit into the hollow of the cheek comfortably. The Siamese are of smaller stature than the Chinese or Indians, but taller than the Japanese and Malays. They have straight black hair, which is worn cut short by both sexes; beards are little developed and complexion a light brown, like the races of southern Europe. The people are polite, courteous to strangers, and have a high sense of self-respect. "Slavery has never existed in Siam, though bond-serfdom, ending with the restitution of the debt, was formerly common, and although abolished as a legal institution still exists in outlying provinces, though only as a *bona fide* agreement between master and man." The position of women is high in Siam. They enjoy, both in business matters and social life, a great independence. Nearly every male can read and write.

Rice "constitutes not merely the principal, but almost the sole food of every one, from the highest noble to the lowliest plebeian; horses, cattle, dogs, cats, and all other domestic animals live on it; it is used for making beer and spirits; it enters largely into all ceremonials, and the superstitious observances in connection with it provide the people with their most frequent occasions for holiday-making." It is rice which forms the cargoes of the thousands of boats ever passing up and down the River Menam. Skill in planting rice seedlings vastly enhances a girl's chances in the marriage market, while a youth who ties the bundles clumsily stands small chance of getting a bride in his own village. In 1885 Siam exported 217,000 tons of rice; in

1903 nearly 800,000 tons, yet the production is still very far short of what it might be.

A reader of "The Kingdom of Siam" is impressed with the fact that the Siamese have considerable enterprise, that their lands are fertile and promising, and that the people will welcome foreign investment and treat the foreigner well. These impressions will be further confirmed by a visit to the Siamese pavilion at the Louisiana Purchase Exposition. That distant country has made a capital and most attractive exhibit at St Louis under the direction of Prof. J. Howard Gore, the Commissioner-General for Siam.

BOOKS RECEIVED

Japan by the Japanese. Edited by W. T. Stead. Pp. 700. 6 x 9 inches. New York: Dodd, Mead & Co. 1904. $5.00.

Early Western Travels, 1748-1846. By Reuben Gold Thwaites. Pp. 365. 9½ x 6½ inches. Cleveland, Ohio: Arthur H. Clark Co. 1904.

Type Studies from United States Geography. By Chas. A. McMurry. With maps and illustrations. Pp. 290. 7½ x 5 inches. New York: MacMillan Co. 1904. $0.50.

Dodge's Advanced Geography. By Prof. Richard Elwood Dodge. With maps and illustrations. Pp. 353. 10 x 8 inches. Chicago: Rand, McNally & Co. 1904. $1.20.

Cyclones of the Far East. By José Algué. With charts. Pp. 266. 9½ x 12 inches. Manila: Philippine Weather Bureau. 1904.

Round-the-World. By J. P. Thomson. With maps, plates, and illustrations. Pp. 357. 10 x 6 inches. Brisbane: Outridge Printing Co., Ltd. 1904.

RECENT GOVERNMENT REPORTS

BUREAU OF FORESTRY

The Basket Willow, Wm. F. Hubbard.

Forest Planting in Western Kansas, Royal S. Kellogg.

Chestnut in Southern Maryland, Raphael Zon.

U. S. GEOLOGICAL SURVEY

The Tin Deposits of the York Region, Alaska, Arthur J. Collier.

A Gazetteer of West Virginia, Henry Gannett.

The Production of Natural Gas, 1903, F. H. Oliphant.

The production of Petroleum, 1903, F. H. Oliphant.

Experiments on Schistosity and Slaty Cleavage, George F. Becker.

The Natural Features and Economic Development of the Sandusky, Maumee, Muskingum, and Miami Drainage Areas in Ohio, Benjamin H. Flynn and Margaret S. Flynn.

The Passaic Flood of 1903, Marshall Ora Leighton.

The Passaic Flood of 1902, George Buell Hollister and Marshall Ora Leighton.

First Conference of Engineers of the Reclamation Service, with accompanying papers, F. H. Newell.

Hydrographical Manual of the U. S. Geological Survey, Edw. C. Murphy, John C. Hoyt, and George B. Hollister.

Water Resources of the Salinas Valley, California, Homer Hamlin.

Geology and Water Resources of Part of the James River, South Dakota, J. E. Todd and C. M. Hall.

Accuracy of Stream Measurements (second enlarged edition), Edward Charles Murphy.

Destructive Floods in the United States in 1903, E. C. Murphy.

Contributions to the Hydrology of Eastern United States, 1903, Myron L. Fuller.

The Underground Waters of Gila Valley, Arizona, Willis T. Lee.

A Geological Reconnaissance Across the Bitter Root Range and Clearwater Mountains in Montana and Idaho, Waldemar Lindgren.

Economic Resources of the Northern Black Hills, J. D. Irving, with contributions by S. F. Emmons and T. A. Jaggar, Jr.

The Copper Deposits of the Encampment District of Wyoming, Arthur C. Spencer.

Zinc and Lead Deposits of Northern Arkansas, George I. Adams, assisted by Purdue and Burchard, with a section on the Determination and Correlation of Formations, E. O. Ulrich.

GEOGRAPHIC CONGRESS ABSTRACTS

TOPOGRAPHIC METHODS USED FOR THE NEW DETAIL MAPS OF THE GRAND CANYON OF THE COLORADO

BY FRANCOIS E. MATTHES

Two atlas sheets comprising about 500 square miles have recently been completed on a scale of $\frac{1}{31680}$ and with a contour interval of 50 feet. With the exception of the plateaus bordering the chasm, the entire area has been mapped by planetable intersections taken from stations on the two rims. The peculiar topography of the Grand Canyon lent itself admirably to the intersection method. Indeed, it proved altogether unique in this respect, a thousand "cuts" from one station being by no means uncommon. The profuseness and intricacy of the details and the vast number of intersections they made necessary for the sketching precluded the use of such methods as are ordinarily employed by topographers for describing and recording "cuts" for future reference. Nor could any method be used in which the memory is in part relied upon in identifying points previously cut in. At the Grand Canyon hundreds of points were not located by intersection until more than a year after they had been cut in the first time. Again, the difficulties of drafting the extremely dense contouring on the often almost mathematically chiseled outlines of the so-called Temples rendered it necessary to evolve some method by which this laborious and time-robbing work could be done in the office without the great expense of maintaining a field party. The method adopted at the Grand Canyon fulfilled all the requirements, essentially through one and the same device. It may be termed the *Preliminary Sketch* method; and, while not claimed to be altogether novel, it certainly has never before been applied on so extensive a scale and with so much systematic elaboration. The paper described this method in detail and was accompanied by a series of sketches showing the successive steps in the work.

GEOGRAPHY AND HISTORY IN THE UNITED STATES

BY ALBERT PERRY BRIGHAM

The object of this paper was to suggest the nature and limits of geographic influence upon American history, and to inquire after the best correlation of such closely related themes in American schools.

Certain results flow from geographic conditions, while others belong to personal initiative and to social traits, which in turn may follow upon untraced geographic influences. But geographic conditions are vital and do not merely form the "theatre" of history.

This appears locally, as in the development of cities, in forms of agriculture and in routes of travel. It appears in great regions, as in the domain of a nation, especially with swift geographic adjustments in a young country which, like our own, has had a migrating frontier. Illustrations—recent changes in New England, and in the shifting status of the northern Mississippi states in their relations to the East and to the South, as affected by routes of transportation and by social and industrial differences. The reclamation of the arid lands belongs also to this series of adjustments. Finally, there may come worldwide adjustments of our own and other nations, in which all men shall be so placed as to win the best things for groups and for the race.

These relations between man and his environment must be appreciated by teachers of both subjects under consideration, and each must know in good measure the subject-matter of the other. These ideals are not now realized; the teacher of geography is not commonly familiar with history, while the Committee of Seven of the American Historical Association makes but meager reference to geography as a fundamental subject.

The two themes may be taught by one teacher, a common German method, but this is not possible in the best American high schools and colleges. The paper then considered methods of more formal correlation and discussed the gains to be won in each field.

A COMPARATIVE VIEW OF THE ARCTIC AND ANTARCTIC

BY FREDERICK A. COOK, M. D.

In forming a comparative view of the two polar areas there are encountered few points of similarity. In the Arctic the climate is usually stimulating. The storms, though at times severe, are spasmodic and separated by intervening periods of agreeable weather, while the color effects are generally cheerful. The sea is quiet, and the land has a coastal fringe free of snow and ice, where life thrives vigorously. To this the Antarctic offers a disheartening contrast. Depression, despair, and melancholy are here pressed into every realm of nature. Almost ceaseless winds drive the air and water with maddening agitation. Continuous low temperatures depress ambition, and the usual play of colors is a veil of gloom. The ice-cap fits the land surface so snugly that there is almost no uncovered ground where life can subsist.

Aside from the unequal distribution of heat supposedly due to the eccentricity of the

earth's axis, the polar dissimilarity would seem to be explained by the relative positions of land and water. The Arctic contains a sea encircled by land; the Antarctic contains a land isolated by a circumpolar sea. The main polar difference can be ascribed to the varying facilities offered by this distribution of land and water for the absorption and elimination of heat for the circulation of atmospheric and oceanic currents and for the migration of life.

In the north the great attraction has been the glory of attaining the pole. In the south the aim has been the determination of the limits of the hypothetical continent. Both objects remain unattained, but the combined efforts have given us a priceless fund of useful knowledge. The fascination of the polar dash will increase rather than diminish, and with it will go a similar enthusiasm to reach the South Pole. A forced march to the Boreal center, though quickly made and under difficulties so great as to prevent detail investigation, would nevertheless give us a valuable record of the physical environment of the mysterious Arctic basin. Such a record could be supplemented by subsequent studies of circumscribed areas, which, when assembled with our present information, would give us a good picture of the Arctic as a whole. Our record of the Antarctic, good as it is of the border lands, is singularly incomplete and incomprehensive. We need several inland efforts to acquaint us with the great overland sea of ice. The chain to connect our present links of frigid knowledge should be carried transpolar into the Boreal Sea, across the Austral highlands, to or beyond the geographical poles. The explorer has next to plan a journey to both the North and the South Poles.

NATIONAL GEOGRAPHIC SOCIETY

THE completed program of popular and scientific meetings for 1904-1905 is printed below. The popular meetings have been planned with a view to give a series of authoritative addresses on the great questions of the Far East, now so prominent. The plan of the technical meetings, which are designed more particularly for those engaged in or specially interested in scientific work, is changed somewhat from the plan of last year, in that there will be two or more speakers at every meeting instead of one. The arrangements announced are definite and there will be no change in the program.

THE POPULAR COURSE

The addresses in this Course will be delivered in the National Rifles Armory, 920 G street, at 8 p. m. on Friday evenings. Mr Foster's address will be published in the December number and other addresses in later numbers of the NATIONAL GEOGRAPHIC MAGAZINE.

November 11.—"The Japanese Side of the War." By Mr William E. Curtis. Illustrated.

November 25.—"China." By Hon. John W. Foster, formerly Secretary of State, author of "American Diplomacy in the Orient," "A Century of American Diplomacy."

December 9.—"Japan." By Baron Kentaro Kaneko, of the House of Peers of Japan, LL. D., Harvard University, 1899.

January 6, 1905.—"Recent Observations on the Russo-Japanese War, in Japan and Manchuria." By Dr Louis Livingston Seaman. Illustrated.

January 20.—"Russia." By Hon. Charles Emory Smith, formerly Postmaster General and Minister to Russia.

February 3.—"The Philippines." The Secretary of War, Hon. Wm H. Taft, formerly Civil Governor of the Philippine Islands, has accepted the invitation of the Society to deliver the address on this subject, provided that the demands of public service do not interfere.

February 17.—"Manchuria and Korea." By Mr Edwin V. Morgan, U. S. Consul to Dalny. Illustrated.

March 10.—"The Panama Canal." Illustrated. Capt. F. A. Staunton U. S. N.

March 24.—"The Commercial Prize of the Orient and its Relation to the Commerce of the United States." By Hon. O. P. Austin, Chief of the Bureau of Statistics. Illustrated.

March 31.—"From Lexington to Yorktown." By Mr W. W. Ellsworth, of the Century Company. Illustrated.

April 14.—"Fighting the Boll Weevil." By Dr L. O. Howard, Chief of the Bureau of Entomology. Illustrated.

April 21.—"Niagara Falls." By Dr G. K. Gilbert, Vice President National Geographic Society. Illustrated.

SCIENTIFIC MEETINGS

For the presentation of technical papers and discussion.

The meetings of this course will be held at the new home of the Society, Hubbard Memorial Hall, Sixteenth and M streets, on Friday evenings, of the following dates.

November 18.—General subject, "Glacial Erosion."

Papers by Mr Willard D. Johnson, and Dr G. K. Gilbert.

December 2.—General subject, "Alaska."

1. Geography of Alaska. By Dr Alfred H. Brooks, of the U. S. Geological Survey.

2. The Alaskan Telegraph System. By General A. W. Greely, U.S.A., Chief Signal Officer.

3. The Salmon Fisheries of Alaska. By Dr Barton W. Evermann, of the Bureau of Fisheries.

4. Introducing Reindeer into Alaska from Siberia. By Dr William Hamilton, of the Bureau of Education.

December 16.—General subject, "China."

"A Geologist in China." By Mr Bailey Willis, of the U. S. Geological Survey.

"A Naturalist in China." By Dr C. L. Marlatt, of the Department of Agriculture.

"Some Remarks About Tibet and Chinese Turkestan." By Mr O. T. Crosby.

December 30.—General subject, "The Rocky Mountains." By Mr Robert H. Chapman, Mr W. H. Osgood, and Mr E. C. Barnard.

Thursday, January 12, 1905.—General subject, "The Reclamation Service." Mr F. H. Newell, Chief Engineer, and other engineers of the Reclamation Service, will describe the different irrigation works now being constructed.

January 13.—Annual meeting. Reports of officers and elections.

January 27.—General subject, "The American Deserts."

1. Vegetation. By Mr F. V. Coville, Botanist of the Department of Agriculture.

2. Physiography. By Dr G. K Gilbert.

3. Introducing the Date Palm. By Mr W. T. Zwingle.

February 10.—General subject, "Progress in Animal Husbandry." There will be papers by Mr George M. Rommel, Mr G. Fayette Thompson, and others of the Department of Agriculture, on the work and plans of the Department for producing distinctive American breeds of Horses, on the Angora Goat, the Fat Tailed Sheep, the Barbadoes Woolless Sheep, on the introduction of the Bos indicus, etc.

February 24.—General subject, "The Botanical Investigations of the Department of Agriculture." By Mr F. V. Coville, Botanist, and members of his staff

March 3.—General subject, "Progress in Plant Physiology." Papers by Dr George T. Moore and others on "Inoculating the Ground," "Protecting Municipal Water Supply Systems," etc.

March 17.—General subject, "Japan."

The Geography of Japan. By Mr Eki Hioki, First Secretary of the Japanese Legation.

The Fisheries of Japan. By Dr Hugh M. Smith.

Agriculture in Japan. By Mr David G. Fairchild.

April 7.—General subject, "Forestry."

Papers by Mr Gifford Pinchot, Mr Overton Price, and others, of the U. S. Bureau of Forestry, and a paper on Japanese Bamboos, by Mr David G. Fairchild.

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